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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,922	OKIMOTO ET AL.	
	Examiner	Art Unit	
	Michael C. Colucci	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/12/05 4/11/05 5/3/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 11-18, 24-25, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Horiguchi et al, US 6243669 (herein after Hori).

Re claims 13-14 and 1, Hori teaches a "speech recognition apparatus that recognizes a sequence of uttered words (Hori col 16 line 11-32 & col 2 line 1-16), comprising"

"a language model (Hori fig. 2) generation and accumulation apparatus that generates and accumulates (Hori col 16 line 1-12) language models for speech recognition (Hori col 16 line 13-32)"

"wherein the language model generation and accumulation apparatus includes: a higher-level N-gram (Hori col 19 line 18-31) language model (Hori col 21 line 24-44) generation and accumulation unit operable to generate and accumulate a higher-level N-gram language model (Hori col 21 line 51-59) that is obtained by modeling each of a plurality of texts (Hori col 21 line 24-44) as a sequence of words (Hori col 21 line 24-44) that includes a word string class (Hori col 11 line 49-53) having a specific linguistic property (Hori col 11 line 9-24)"

"a lower-level N-gram language model (Hori col 21 line 24-44) generation and accumulation unit operable to generate and accumulate a lower-level N-gram language model (Hori col 21 line 59-67) that is obtained by modeling a sequence of words (Hori col 21 line 24-44) within the word string class (Hori col 11 line 49-53)"

(High and low level classification is construed to be dependent upon an analysis through dictionaries/texts structures (high) or just a sequence of words from a structure (low).)

"the speech recognition apparatus recognizes the speech (Hori col 2 line 1-16) by use of the higher-level N-gram language model (Hori col 21 line 51-59) that is accumulated by the higher-level N-gram language model generation and accumulation unit (Hori col 21 line 24-44) and the lower-level N-gram language model (Hori col 21 line 59-67) that is accumulated by the lower-level N-gram language model generation and accumulation unit (Hori col 21 line 24-44)."

Re claims 15 and 2, Hori teaches a "speech recognition apparatus (Hori col 18 line 42-51) according to Claim 14, wherein the higher-level N-gram language model generation and accumulation unit and the lower-level N-gram language model generation and accumulation unit generate the respective language models, using different corpuses (Hori col 21 line 24-44)"

"the speech recognition apparatus recognizes the speech (Hori col 18 line 42-51) by use of the higher-level N-gram language model and the lower-level N-gram language

model that have been respectively built using the different corpuses (Hori col 21 line 24-44)"

Re claims 16 and 3, Hori teaches a "speech recognition apparatus according to Claim 15, wherein the lower-level N-gram language model generation and accumulation unit includes"

"a corpus (Hori col 21 line 24-44) update (Hori col 9 line 6-24) unit operable to update (Hori fig. 18) the corpus for the lower-level N-gram language model (Hori col 16 line 12-32 & fig. 12)"

"the lower-level N-gram language model generation and accumulation unit updates the lower-level N-gram language model based on the updated corpus (Hori col 9 line 6-24), and generates the updated lower-level N-gram language model (Hori col 16 line 12-32 & fig. 12)"

"the speech recognition apparatus recognizes the speech (Hori col 18 line 42-51) by use of the updated lower-level N-gram language model"

Re claims 17 and 4, Hori teaches a "speech recognition apparatus according to Claim 14, wherein the lower-level N-gram language model generation and accumulation unit analyzes the sequence of words within the word string class into one or more morphemes (Hori col 9 line 62 – col 10 line 13) that are smallest language units having meanings, and generates the lower-level N-gram language model by modeling each

sequence of said one or more morphemes in dependency on said word string (Hori col 11 line 49-53) class (Hori col 9 line 62 – col 10 line 13)"

"the speech recognition apparatus recognizes the speech (Hori col 18 line 42-51) by use of the lower-level N-gram language model (Hori fig. 2) that has been modeled as the sequence of said one or more morphemes (Hori col 9 line 62 – col 10 line 13)"

Re claims 18 and 5, Hori teaches a "speech recognition apparatus according to Claim 14, wherein the higher-level N-gram language model generation and accumulation unit substitutes the word string class with a virtual word (Hori col. 27 line 45-56), and then generates the higher-level N-gram language model by modeling a sequence made up of said virtual word and the other words (Hori col 9 line 62 – col 10 line 13), said word string class being included in each of the plurality of texts (Hori col 21 line 24-44) analyzed into morphemes (Hori col 9 line 62 – col 10 line 13)"

"the speech recognition apparatus recognizes the speech by use of the higher-level N-gram language model that has been modeled as the sequence made up of the virtual word and the other words (Hori col 9 line 62 – col 10 line 13)"

Re claims 24 and 11, Hori discloses a "speech recognition apparatus according to Claim 14, wherein the higher-level N-gram language model generation and accumulation unit generates the higher-level N-gram language model in which each sequence of N words (Hori col 21 line 24-44) including the word string class (Hori col 11

line 49-53) is associated with a probability (Hori col 11 line 9-24) at which said each sequence of words occurs (Hori col 16 line 13-32)"

"the speech recognition apparatus comprises a word string hypothesis generation unit operable to evaluate a word string hypothesis (Hori col 16 line 11-32) by multiplying each probability (Hori col 11 line 9-24) at which said each sequence of N words including the word string class occurs (Hori col 16 line 13-32)"

(Examiner takes Official Notice that it is well known to multiply probabilities, (See Holmes, Speech Synthesis and Recognition 2nd edition, 2001, page 153-155))

Re claims 25 and 12, Hori discloses a "speech recognition apparatus according to Claim 14, wherein the lower-level N-gram language model generation and accumulation unit generates the lower-level N-gram language model by associating each N-long chain of words (Hori col 21 line 24-44) constituting the word string class (Hori col 11 line 49-53) with a probability (Hori col 11 line 9-24) at which said each chain of words occurs (Hori col 16 line 13-32)"

"the speech recognition apparatus comprises a word string hypothesis generation unit operable to evaluate a word string hypothesis (Hori col 16 line 11-32) by multiplying each probability (Hori col 11 line 9-24) at which said each sequence of N words inside the word string class occurs (Hori col 16 line 13-32)"

(Examiner takes Official Notice that it is well known to multiply probabilities, (See Holmes, Speech Synthesis and Recognition 2nd edition, 2001, page 153-155). A chain of words is construed as a sequence of words.)

Re claim 28, Hori discloses a "speech recognition method comprising: a step of categorizing each word string having a specific linguistic property (Hori col 11 line 9-24) as a word string class (Hori col 11 line 49-53), and providing, to said each word string, a language likelihood which is a logarithm value of a probability, by use of class dependent word N-grams (Hori col 19 line 18-31) that are obtained by modeling said word string class in dependency (Hori col 9 line 62 – col 10 line 13) on said word string class based on a linguistic relationship between words constituting said word string (Hori col 11 line 49-53) class"

"a step of analyzing a text into a word and the word string class, and providing, to a sequence of said word and the word string class (Hori col 21 line 24-44), a language likelihood which is a logarithm value of a probability (Hori col 11 line 9-24), by use of class N-grams that are obtained by modeling said sequence of the word and the word string class based on a linguistic relationship (Hori col 2 line 51-59)"

(Examiner takes official notice that it is well known in the art to use logarithms in conjunction with probability calculations and distribution for a more accurate and error free result (See Holmes, Speech Synthesis and Recognition 2nd edition, 2001, page 153-155))

"a step of (i) comparing features parameters (Hori fig. 26) extracted from a series of speeches with a pronunciation (Hori col 16 line 13-32) as well as an acoustic characteristic (Hori col 16 line 11-32 & fig. 2) of each word and generating a set of word hypotheses including an utterance segment (Hori col 16 line 11-32) of said each word

and an acoustic likelihood (Hori col 18 line 52-67) of said each word, (ii) generating a word string hypothesis from said set of word string hypotheses (Hori col 16 line 11-32) with reference to the class N-grams and the class dependent word N-grams (Hori col 11 line 49-53), and (iii) outputting a result of the speech recognition"

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: **(See MPEP Ch. 2141)**
>
> a. Determining the scope and contents of the prior art;
> b. Ascertaining the differences between the prior art and the claims in issue;
> c. Resolving the level of ordinary skill in the pertinent art; and
> d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

4. Claims 6-10, 19-23, 26-27, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiguchi et al, US 6243669 (herein after Hori) in view of Goudie US 4797930 (herein after Goudie.

Re claims 19, 26-27, 29-30, and 6, the combined teaching of Hori and Goudie disclose a "speech recognition apparatus according to Claim 18, wherein the lower-level

N-gram (Hori col 19 line 18-31) language model generation and accumulation unit includes"

"an exception word judgment unit operable to judge whether or not a specific word out of the words that appear in the word string class should be treated as an exception word (Hori col 23 line 62 – col 24 line 6), based on a linguistic property (Hori col 11 line 9-24) of said specific word, and divides (Hori col 21 line 24-44) the exception word into (i) a syllable that is a basic phonetic unit (Hori col 2 line 30-42) constituting a pronunciation of said word (Hori col 16 line 13-32) and (ii) a unit that is obtained by combining syllables (Goudie col 27 line 27-32) based on a result of said judgment, said exception word being a word not being included as a constituent word of the word string class (Hori col 23 line 62 – col 24 line 6)"

"the language model generation and accumulation apparatus further comprises a class dependent syllable N-gram (Hori col 19 line 18-31) generation and accumulation unit operable to generate class dependent syllable (Goudie col 27 line 49-55) N-grams by modeling a sequence made up of the syllable (Goudie col 26 line 64 – col 27 line 14) and the unit obtained by combining syllables (Goudie col 27 line 27-32) and by providing a language likelihood (Hori col 18 line 52-67) to said sequence in dependency on either the word string class or the linguistic property (Hori col 11 line 9-24) of the exception word (Hori col 23 line 62 – col 24 line 6), and accumulate said generated class dependent syllable N-grams, said language likelihood being a logarithm value of a probability (Hori col 11 line 9-24)"

(Examiner takes official notice that it is well known in the art to use logarithms in conjunction with probability calculations and distribution for a more accurate and error free result (See Holmes, Speech Synthesis and Recognition 2nd edition, 2001, page 153-155))

"the speech recognition apparatus recognizes the speech by use of the class dependent syllable (Goudie col 27 line 49-55) N-grams"

Hori fails to teach sequences of syllables combined together having class dependency. Goudie teaches syllable classification where syllables are dependent on a class. Goudie also teaches combining/concatenating speech synthesis parameters and sequences of phonological linguistic unit indicia. Therefore, the combined teaching of Hori and Goudie as a whole would have rendered obvious speech recognition having generation and accumulation of class dependent syllables as well as the combining of syllables providing a probability.

Re claims 20 and 7, the combined teaching of Hori and Goudie disclose a "speech recognition apparatus according to Claim 19, wherein the language model generation and accumulation apparatus further comprises"

"a syntactic tree generation (Hori col 11 line 54-65) unit operable to perform morphemic analysis (Hori col 9 line 62 – col 10 line 13) as well as syntactic analysis (Hori col 11 line 54-65) of a text"

"generate a syntactic tree in which said text is Structured by a plurality of layers (Hori fig. 6), focusing on a node that is on said syntactic tree and that has been selected on the basis of a predetermined criterion (Hori col 11 line 54-65)"

(Predetermined criterion is construed as rules.)

"wherein the higher-level N-gram language model generation and accumulation unit generates the higher-level N-gram language model for syntactic tree, using a first subtree (Hori col 12 line 5-28) that constitutes an upper layer (col 12 line 29-44) from the focused node (col 12 line 29-44 & fig. 6)"

"the lower-level N-gram language model generation and accumulation unit generates the lower-level N-gram language model for syntactic tree, using a second subtree (Hori col 12 line 5-28) that constitutes a lower layer from the focused node (Hori col 12 line 29-44 & fig. 6)"

"the speech recognition apparatus comprises: an acoustic processing unit (Hori col 16 line 11-32) operable to generate feature parameters (Hori fig. 26) from the speech"

"a word comparison unit operable to compare a pronunciation (Hori col 16 line 11-32) of each word with each of the feature parameters (Hori fig. 26), and generate a set of word hypotheses (Hori col 16 line 11-32) including an utterance segment (Hori col 16 line 11-32) of said each word and an acoustic likelihood (Hori col 18 line 52-67) of said each word"

"a word string hypothesis generation unit (Hori col 16 line 11-32) operable to generate a word string hypothesis from the set of word hypotheses with reference to the

higher-level N-gram language model for syntactic tree and the lower-level N-gram language model for syntactic tree (Hori col 11 line 54-65 & fig. 6), and generate a result of the speech recognition"

(Sub-trees are construed to be within a syntax tree, where a tree is construed to be a structure of the input data in nodal tree form.)

Re claims 21, 22, and 23, and 8-10, the combined teaching of Hori and Goudie disclose a "speech recognition apparatus according to Claim 20, wherein the lower-level N-gram language model generation and accumulation unit includes"

"a language model generation exception word judgment unit operable to judge a specific word appearing in the second subtree (Hori col 12 line 5-28) as an exception word (Hori col 23 line 62 – col 24 line 6) based on a predetermined linguistic property (Hori col 11 line 9-24), said exception word being a word not being included as a constituent word (Hori col 23 line 62 – col 24 line 6) of any subtrees"

"the lower-level N-gram language model generation and accumulation unit generates the lower-level N-gram language model by dividing (Hori col 21 line 24-44) the exception word into (i) a syllable that is a basic phonetic unit (Hori col 2 line 30-42) constituting a pronunciation of said word (Hori col 16 line 13-32) and (ii) a unit that is obtained by combining syllables (Goudie col 27 line 27-32), and then by modeling a sequence made up of the syllable (Goudie col 26 line 64 – col 27 line 14) and the unit obtained by combining syllables (Goudie col 27 line 27-32) in dependency on a location of the exception word (Goudie col 26 line 64 – col 27 line 14) in the syntactic tree (Hori

col 11 line 54-65) and on the linguistic property of said exception word (Hori col 11 line 9-24)"

"the word string hypothesis generation unit generates the result of the speech recognition (Hori col 16 line 11-32)"

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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